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10/587,240	07/26/2006	Hidekazu Nakanishi	2006_1083A	8549

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EXAMINER	
SUMMONS, BARBARA	
ART UNIT	PAPER NUMBER
2817	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/587,240	NAKANISHI ET AL.	
	Examiner	Art Unit	
	BARBARA SUMMONS	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 July 2006 (pre-amendment)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *19-24* is/are allowed.

6)☒ Claim(s) *12-18 and 25* is/are rejected.

7)☒ Claim(s) *26 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/26/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 17 and 18 are objected to because they are identical in scope. That is, they both depend from claim 12 which already recites that the filter is a ladder type filter (see claim 12, lines 4-5) such that the filter of claim 17 is also "the ladder type surface acoustic wave filter". Was one of these claims intended to depend from claim 13 (see also claim 15)? Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. § 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 14 and 15 are rejected under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for a filter with series resonators having a dielectric film (see claim 12, lines 6-7) and a “resonance frequency...set higher than” the parallel resonators that have no dielectric film (see claim 12, lines 8-9, claim 13 and the specification at the paragraph spanning pages 11-12), does not reasonably provide enablement for series resonators with a dielectric film having a “resonance frequency...set lower than” (emphasis added) parallel resonators having no dielectric film (claim 14). The only disclosure of resonators with a dielectric film having a lower resonance frequency than those without the film is when the resonators with the dielectric film are parallel resonators (see e.g. the specification at page 15, lines 3-6 and

Fig. 5) which would directly contradict claim 12 (lines 6-9). Therefore, the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims, especially since it is known that the resonance frequency of the parallel resonators forms the lower edge of the pass band of such ladder filters, while the higher resonance frequency of the series resonators is located at the approximate center of the pass band and is approximately equal to the anti-resonance frequency of the parallel resonators.

The Examiner notes that it would appear that claim 14 (and claim 15 depending therefrom) requires its own alternative independent claim to a filter with a dielectric film formed only on the parallel resonators and not on the series resonators, i.e. the converse of claim 12, as shown as another embodiment in Applicants' Fig. 5.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 12-18 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Allen et al. U.S. 5,726,610 taken alone.

Regarding claims 12 and 13 Fig. 8 of Allen et al. discloses a surface acoustic wave (SAW) filter where a plurality of SAW resonators including a comb electrode (see Fig. 2) are coupled on a piezoelectric substrate 52, wherein the SAW resonators are coupled as series resonators 50_1 and parallel resonators 50_2 to form a ladder filter, a dielectric film 96 (see also Fig. 11) is formed with a constant thickness, i.e. uniformly (see e.g. col. 6, lines 36-39 and 58-63) on the surface of the series SAW resonators, and is not formed on the surface of the parallel SAW resonators, and as can be seen in Fig. 5, the resonance frequency fr of the series resonators 50_1 with the dielectric film is higher than fr of the parallel resonators 50_2 without the dielectric film.

Regarding claim 14, as far as the claim can be understood, Fig. 6 of Allen et al. shows a dielectric film formed on parallel resonators only and not the series resonators, and therefore on the resonators having a lower resonance frequency than those without the dielectric film. Regarding claim 16, the dielectric film is silicon dioxide (see col. 5, lines 8-9). Regarding claims 15, 17 and 18, the filters of Figs. 6 and 8 having the respective responses shown in Figs. 7 and 9, are used in a duplexer as filters 16' and 16'' in Fig. 1 providing the responses shown in Fig. 14 (see col. 7, lines 12-35).

Regarding independent claim 25, as shown in Figs. 14, 6 and 8 each of the transmission filter and reception filter is a ladder filter, wherein depending on which frequency end side of each pass band requires a steeper filter characteristic (Fig. 14), a dielectric film is formed on at least one of the SAW resonators coupled in series, or on at least one of the SAW resonators coupled in parallel.

However, regarding claim 12, Allen et al. does not disclose reflectors for the resonators (see Fig. 2), and regarding claim 25, does not disclose the duplexer having a phase shifter.

The Examiner Takes Official Notice and cites numerous references below as evidence, that it would have been extremely well known to include optional reflectors with the comb electrode in SAW resonators, and that it would have been extremely well known to provide phase shifters in duplexers to ensure required separation between transmission and reception signals.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW filter duplexer of Allen et al. by having provided that each of the SAW resonators include reflectors and that the duplexer include a phase shifter, because such obvious modifications would have been respectively, merely the inclusion of an art recognized optional structure that would have provided the known benefit of increased energy trapping of the surface wave, and the inclusion of an art recognized optional structure that would have provided the known benefit of required isolation of the transmission and reception signals dependent upon

the individual intended use, as would have been known by one of ordinary skill in the art as evidence by other art of record (see below).

Allowable Subject Matter

6. Claims 19-24 are allowable over the prior art of record.

7. Claims 26 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 19, the prior art of record does not disclose or fairly suggest a SAW filter wherein a "capacity ratio of the surface acoustic wave resonator having the dielectric film is set higher than that of the surface acoustic wave resonator having no dielectric film" (see the last two lines thereof), especially since Applicants indicate that such a structure "decreases the difference between the resonance frequency and anti-resonance frequency" of the increased capacity ratio resonator (see the specification at e.g. page 11, lines 28-35), which appears to be opposite of the function of Allen. That is, Allen shows in Figs. 6 and 7 that when the parallel resonators have a dielectric film, the distance between the parallel resonators' resonance and anti-resonance frequency oppositely increases to form the wider pass band shoulder area 82' (Fig. 7).

Regarding claims 26 and 27, Allen et al. also discloses an opposite relationship to the claimed invention such that, e.g., when the transmission filter is the lower

frequency filter in Fig. 14, the filter of Fig. 6 is used which has dielectric film on the parallel resonators, and the higher frequency reception filter has a dielectric film on the series resonators as shown in Figs. 8 and 9.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kwan et al. U.S. 5,654,680 provides evidence in a very similar reference, that using reflectors with the resonators would have been a well known optional SAW resonator structure (see Fig. 2 and col. 4, lines 1-4).

Hickernell U.S. 5,471,178 also provides evidence that reflectors would have been a known optional SAW resonator structure (see col. 3, lines 2-16).

Hikita et al. U.S. 5,1115,216 also provides evidence of reflectors being optional in SAW resonators (see col. 5, lines 40-48 vs. col. 12, lines 59-66).

Hickernell U.S. 6,201,457 also discloses reflectors being optional in SAW resonators as known by those of ordinary skill in the art (see col. 2, lines 64-67).

Iwamoto et al. U.S. 2002/0109561 provides evidence that it would have been well known in the SAW duplexer art to provide a phase shifter (see matching circuit 1 in Figs. 2 and 7) in a SAW ladder filter duplexer to prevent interference between the transmission and reception signals (see section [0013]).

Takayama et al. U.S. 2002/0140519 also provides evidence that it would have been known to provide a phase shifter 3 (see Fig. 1) in a SAW ladder filter duplexer to prevent interference/noise or loss (see section [0005]).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BARBARA SUMMONS whose telephone number is (571)272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bs
June 2, 2008

/Barbara Summons/
Primary Examiner, Art Unit 2817